

REVISION OF THE AUSTRALIAN ZUPHIINAE 2. *COLASIDIA MONTEITHI* SP.
NOV. FROM NORTH QUEENSLAND, FIRST RECORD OF THE TRIBE LELEUPIDIINI
IN AUSTRALIA (INSECTA: COLEOPTERA: CARABIDAE).

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ABSTRACT

Colasidia monteithi sp. nov. is an inhabitant of lowland rainforest of northern Queensland. It is the first representative of the tribe Leleupidiini of the subfamily Zuphiinae recorded from Australia. *Colasidia monteithi* is apotypic within the genus *Colasidia* and is presumably derived from more plesiotypic ancestors similar to species still living in New Guinea. The high degree of apomorphy, and the present distribution, indicate that the ancestor of *Colasidia monteithi* was an ancient invader into Australia.

INTRODUCTION

Zuphiinae is a small but, especially in the Australian area, quite diverse group within the truncatipennian Carabidae. In Australia 12 species have been found. The genus *Planetes* is included here in the Zuphiinae although its systematic status is still controversial (see Jedlicka 1963; Habu 1967; Reichardt 1967; Darlington 1968). Genera known from Australia are *Zuphium* Latreille, *Parazuphium* Jeannel, *Acrogenys* Macleay, *Pseudaptinus* Castelnau, and *Planetes* Macleay. Since all species were described between 1862 and 1890, and because most of the diagnoses are unsatisfactory, only few species can be determined with certainty. A revision of the Australian Zuphiinae was started by Baehr (1984).

The tribe Leleupidiini was discovered only recently, but constitutes a rather extensive group (Basilewsky 1951, 1953, 1954, 1967) of small and oddly shaped beetles. Although, originally recorded from tropical Africa, mainly from the high mountains of East Africa, species were later described from Asia (Basilewsky 1954; Landin 1955). Since then, Leleupidiini also became known from Madagascar (Basilewsky 1967), and Darlington (1971) extended their geographical range to New Guinea, where two species are now known.

Very little is known about the habits of species of Leleupidiini, all discoveries having been made in the course of extraction or washing of soil and litter samples. All species seem to be rather rare. The three recorded species of the Asiatic-New Guinea genus *Colasidia*, for example, are known from single females only. Presumably the species are secretive and perhaps burrow in loose soil and litter. To my knowledge there are no indications of myrmecophilous habits in any species, but some

morphological attributes, e.g. the moniliform antennae, and the peculiar, enlarged, and glandular terminal segment of the labial palpi, could suggest such habits.

The discovery of a new species of the genus *Colasidia* by G.B. Monteith now extends the geographical distribution of the Leleupidiini to Australia.

Type material is lodged at the Queensland Museum (QM).

KEY TO THE AUSTRALIAN AND NEW GUINEAN GENERA OF ZUPHIINAE

The diagnostic features of the Leleupidiini (for description of the tribe see Basilewsky 1951) can be gathered from the following key, which comprises all genera of Zuphiinae so far recorded from Australia and New Guinea.

1. First antennal segment short and thick, shorter than second and third segments together. Antennae moniliform, short, extending only to middle of pronotum. Head very long, eyes small, temples at least three times as long as eyes. Last segment of labial palpi extraordinarily large, square, asymmetrically fixed to second segment. Tribe Leleupidiini..... genus *Colasidia* Basilewsky
 First antennal segment as long as, or longer than second and third segments together. Head shorter, temples at most three times as long as eyes. Last segment of labial palpi smaller, if extraordinarily large, then not square, nor asymmetrically fixed to second segment..... 2

2. Striae of elytra duplicate, thus elytra with 19 narrow ridges. Basal border of elytra entire. Basal three segments of ♂ anterior tarsus asymmetrically widened, biserially squamose. Squamosity oblique, in medio-distal direction. Tribe Planetini genus *Planetes* Macleay
Striae of elytra not duplicate. Basal border of elytra not entire. ♂ anterior tarsus slightly widened, symmetrical. Squamosity of tarsus straight, biserial or uniserial only at inner edge of tarsus 3
3. Antennae short, moniliform, not attaining base of pronotum. First segment as long as second and third segments together. Head behind eyes wide, square, back of head straight, hardly narrowed. Eyes large. Last segment of maxillary palpi very large, enlarged to tip. Elytra parallel, apex roundish cut off, somewhat drawn in to middle. Elytra each with 6 fine ridges. Tribe Patriziini genus *Agastus* Schmidt-Göbel¹
Antennae longer, not moniliform, extending beyond base of elytra. Last segment of maxillary palpi normal, only slightly enlarged to tip. Apex of elytra not rounded, nor drawn in to middle. Elytra at most with one ridge at seventh interval. Tribe Zuphiini (*sensu stricto*) 4
4. First antennal segment only as long as second and third segments together or slightly longer. Pronotum with several marginal setae in anterior half. Elytra with a row of 8 to 10 erect setae at third, fifth, and seventh intervals. Seventh interval carinate or at least considerably more raised than the other intervals. Flightless, elytra fused together....; genus *Acrogenys* Macleay²
First antennal segment considerably longer than second and third segments together. Pronotum with one marginal seta in anterior half. Elytra without conspicuous erect setae at third, fifth, and seventh intervals. All intervals similarly shaped, mostly rather depressed. Generally winged, elytra free..... 5
5. Length of first antennal segment less than 1.5 × second and third segments together. Posterior margin of head strongly rounded. Width of 'neck' at least 0.5 × width of head including eyes. Elytra rather convex with considerably raised intervals. genus *Pseudaptinus* Castelnau
Length of first antennal segment nearly 2 × second and third segments together. Posterior margin of head rather truncate. Width of 'neck' less than 0.5 × width of head including eyes. Elytra depressed, intervals flat, at most very feebly raised. 6
6. Larger, length over 7.5 mm. Elytra with distinct intervals. First antennal segment with one long tactile seta near tip..... genus *Zuphium* (*sensu stricto*) Latreille
Smaller, length less than 7 mm. Intervals hardly perceptible. First antennal segment with several long tactile setae genus *Parazuphium* Jeannel

Colasidia Basilewsky

Colasidia Basilewsky, 1954, p. 215, fig. 1. Darlington, 1971, p. 332.

Type species: *Colasidia malayica* Basilewsky, 1954.

DIAGNOSIS

Genus of the tribe Leleupidiini Basilewsky of the subfamily Zuphiinae. Ant-like, small zuphiine beetles with fairly small eyes. Tooth of mentum long, nearly as long as lateral lobes, tip rounded or feebly notched. Last segment of labial palpi very large, square, just about two times longer than wide. Punctures of dorsal surface very coarse. Wings in all known species atrophied.

KEY TO THE KNOWN SPECIES

1. Eyes larger, roundish, length of eyes about one third of length of temples behind eyes. Head wider across eyes than across temples. Hind part of head strongly rounded (New Guinea)..... *C. papua* Darlington, 1971
Eyes smaller, oblique, length of eyes less than one third of length of temples. Head widest at a distance behind eyes 2
2. Posterior border of temples feebly rounded off. Posterior part of head nearly straight. Head decidedly trapezoidal, wider than pronotum. Posterior angles of pronotum blunt, just slightly projecting (Singapore)....
..... *C. malayica* Basilewsky, 1954

¹A species of the genus *Agastus*, hitherto only recorded from southeast Asia and from Africa, has been recently found in New Guinea (Baehr 1985). Members of that genus are likely to be discovered in northern Australia.

²*Acrogenys australis* Blackburn 1890 is a species of the genus *Pseudaptinus* Castelnau.

Posterior border of temples decidedly rounded off. Thus, posterior part of head rounded. Head not strikingly trapezoidal, narrower than pronotum. Posterior angles of pronotum acute and projecting. Sides in front of posterior angles strongly curved 3

3. Elytra short and wide, very convex, less than $1.5 \times$ as long as wide, more than $2 \times$ wider than pronotum. Pronotum short, nearly as wide as long ($0.95 \times$). Head short, nearly as wide as pronotum. Ratio length of head (labrum to anterior border of 'neck') to width of head less than 1.75 (New Guinea)
..... *C. madang* Darlington, 1971

Elytra rather elongate, more than $1.5 \times$ as long as wide, only $1.75 \times$ as wide as pronotum. Pronotum conspicuously narrower than long ($0.85 \times$). Head elongate, distinctly narrower than pronotum ($0.8 \times$). Ratio length of head to width of head more than 2 (Australia, North Queensland)
..... *C. monteithi* sp. nov.

Colasidia monteithi sp. nov.

MATERIAL EXAMINED

HOLOTYPE: QM T.9181, presumably ♀ (sex not confirmed by dissection). Australia, North Queensland, 2 km WNW of Cape Tribulation ($16^{\circ}05'S$, $145^{\circ}28'E$). 23.ix.-7.x.1982, G. Monteith, D. Yeates & G. Thompson.

DESCRIPTION

Measurements: Overall length: 5.18 mm, length to apex of elytra: 4.47 mm, maximum width: 1.32 mm.

Colour: Head and pronotum reddish-brown, elytra blackish. Labrum, antennae, mouthparts, and legs yellow. Lower surface dark reddish, first abdominal segments brownish, last three abdominal segments dark brown to black.

Microsculpture: Upper surface rather sparsely, but very coarsely and rather regularly, punctate, sparsely hirsute, with long, yellow hairs. Pility partly inclined, partly erect. No microsculpture visible between the punctures. Also lower surface and legs wholly punctate and hirsute.

Head: Very elongate (more than twice as long as maximum width). Head steadily tapering from posterior border to front. Eyes small, very oblique, temples behind eyes about $5 \times$ longer than diameter of eye, rounded off behind. 'Neck' one third of width of head, rounded off behind. Frontal furrows long, not reaching anterior border of eyes. Frons and vertex convex. A straight ridge from median border of eye to base of antenna. Above base of antenna a

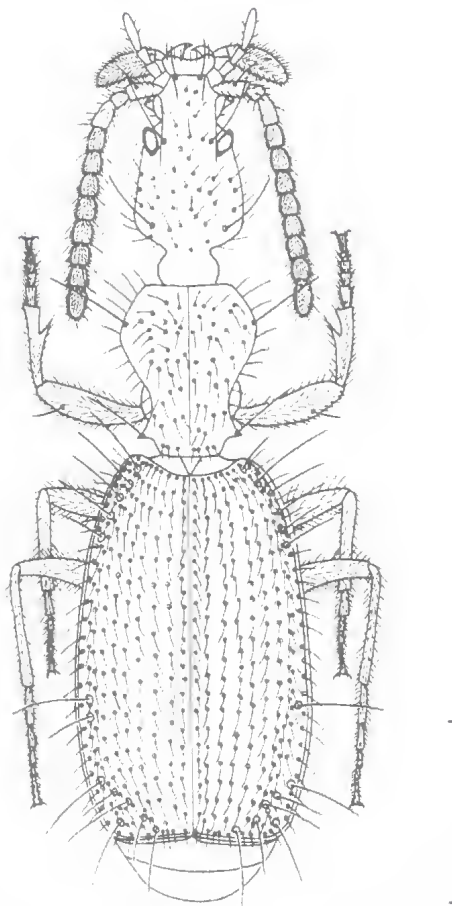


FIG. 1: *Colasidia monteithi* sp. nov. Habitus. Scale = 1 mm.

triangular prominence. Anterior supraorbital seta at anterior border of eye, posterior seta far away from eye near posterior border of temples. Clypeus not divided from frons, clypeus smooth, with two long setae and several short bristles along anterior border. Labrum rather large, anterior border feebly notched, side parts widened, thus, basal parts of mandibles concealed. Labrum six-setose, sides with several additional short bristles. Mandibles short, inner border straight, apex suddenly hook-like curved. Mentum with a long and stout, entire tooth which is only slightly shorter than lateral lobes, bisetose. Epilobes distinctly separated, longer than lobes, tip somewhat curved inwards. Glossa corneous, apex truncate, bisetose. Paraglossae membranaceous, much longer than glossa, distally strongly curved inwards. Terminal segment of labial palpi very large, square, about twice as long as wide, entire

surface with long and dense pilosity, ventrally with a long glandular cleft. Penultimate segment with some bristles. Base of maxillae laterally protruding, with some long hairs. Galea sparsely hirsute. Basal part of lacinia wide, corneous, lateral border bristled, distal part narrower and only weakly corneous. Median border of lacinia not dissected. Maxillary palpus fairly small, pointed, last segment sparsely pilose. Antennae short, moniliform, extending to apical third of pronotum. Basal segment $0.8 \times$ as long as second and third segments together. Segments 4-10 shorter than wide. Basal segment with a long tactile seta and several short bristles, remaining segments with an apical row of long setae and with a double, very dense pilosity, mixed from long and erect, and short and depressed hairs, respectively.

Pronotum: Distinctly shorter and wider than head (ratio width of head/width of pronotum: 0.79), and clearly longer than wide (ratio width of pronotum/length: 0.83), heart-shaped. Sides strongly curved to the rounded anterior angles, widest in front of first third. Sides concave in front of the pointed and prominent posterior angles, these slightly advanced from base. Base straight. Sides bordered, without lateral groove, apex and base not bordered. Basal grooves indistinct due to the coarse punctures. Median line complete, but fairly indistinct. Pronotum convex, coarsely punctate, with sparse, erect pilosity. One lateral seta each a short distance in front of first third and at the protruding posterior angles.

Elytra: Broadly oval and strongly convex, about $1.5 \times$ longer than wide, less than twice as wide as

pronotum (ratio width of elytra/width of pronotum: 1.76), widest in last third. Shoulders rounded off, apex transversely cut off, somewhat drawn in to middle, bordered. Beyond apical border with a narrow, membranous band. Striae distinguished only by the very coarse, but fairly regular punctures. No basal pore visible. Pilosity fairly sparse, but elongate, obliquely erect. Border along ninth stria basally with a row of about six, behind middle with one or two, and near apex with about six umbilicous pores and very long setae. Also lateral border of elytra pilose. No elytral pores recognizable. Elytra fused together, hind wings reduced.

Lower surface: Wholly hirsute, with exception of proepisterna (only anteriorly hirsute) and of anterior parts of first abdominal sternites. Sternites with a long seta on each side, last sternite with one seta each side (♀). Metepisternum quadrate.

Legs: Fairly elongate, especially posterior tarsus. Whole legs densely hirsute, lower parts of all tarsal segments pilose. Claw smooth.

♂ aedeagus: Not known.

Immature stages: Unknown.

DISTRIBUTION

Only known from Cape Tribulation at the base of Cape York Peninsula, northern Queensland.

HABITS

The unique specimen of *Colasidia monteithi* was discovered by use of Berlese-extraction of leaf litter. According to G.B. Monteith's information the collecting area is one of the wettest in Australia and has still a very luxuriant rain forest flora. Apart from this information, virtually nothing is known about the habits of this beetle, as is the case in all other species of the genus. The circumstances of discovery, the small eyes, short antennae, and the 'stream-lined' body shape all point to a habit of living in leaf litter or loose soil. Striking peculiarities are the very large, glandular terminal segments of the labial palpi, which are reminiscent of the antennal clubs of Paussinae. Perhaps, they can be regarded as an indication of a myrmecophilous habit.

DISCUSSION

Colasida monteithi is distinguished from the three other species of the genus by its very narrow body shape, especially by the exceptionally elongate and narrow head and by the small and oblique eyes. The narrow head — in comparison to the pronotum — and the coarsely punctate

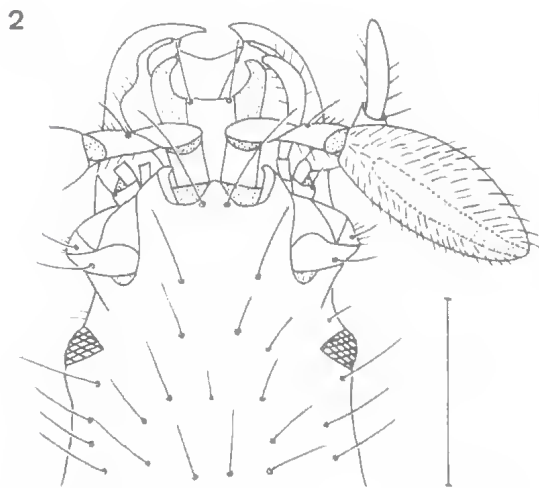


FIG. 2: *Colasidia monteithi* sp. nov. Lower side of head. Scale = 1 mm.

upper surface are shared by *C. monteithi* and both species from New Guinea, *C. papua* and *C. madang*, which indeed seem to be the nearest relatives of *C. monteithi*. Additional diagnostic differences between these species and *C. monteithi* are given in the key.

If large eyes and the rounded, less widened back of the head are interpreted as plesiomorphic character states, then *C. papua* seems to constitute the most primitive species of the genus. Reduction of eyes and elongation, or widening of the back of head can be interpreted as adaptations to a secretive life in soil or litter or in the upper soil strata proper, and they must be regarded as apomorphic character states. Reduction of eyes is most striking in *C. malayica* and *C. monteithi*, whereas *C. madang* is intermediate between these species and *C. papua*. The same is true concerning the deformation of the head and the extreme widening and development of its angular hind edges in *C. malayica*, and the extreme elongation of the head in *C. monteithi*. In these characters *C.*

madang is also intermediate. From this viewpoint *C. malayica* and *C. monteithi* constitute the most apotypic species. *C. malayica*, however, seems still more divergent morphologically than *C. monteithi*. At the same time the geographical ranges of these two species are located at the limits of the known range of the species within the genus. With regard to distribution, *C. malayica* is the most isolated of the species.

It is likely that the centre of origin of the genus *Colasidia* was in New Guinea, where the most plesiotypic species live. From there the apotypic species spread to the north (Malaysia) and to the south (North Queensland). This view is opposite to that of Darlington's (1971), according to whom the (presumably winged) ancestors of the New Guinean species came from the Oriental area.

With regard to the distribution of the whole tribe Leleupidiini, I must agree that the ancestors of the genus *Colasidia* originated in the Oriental Region. The recent distribution of the species, however, points to a secondary migration from

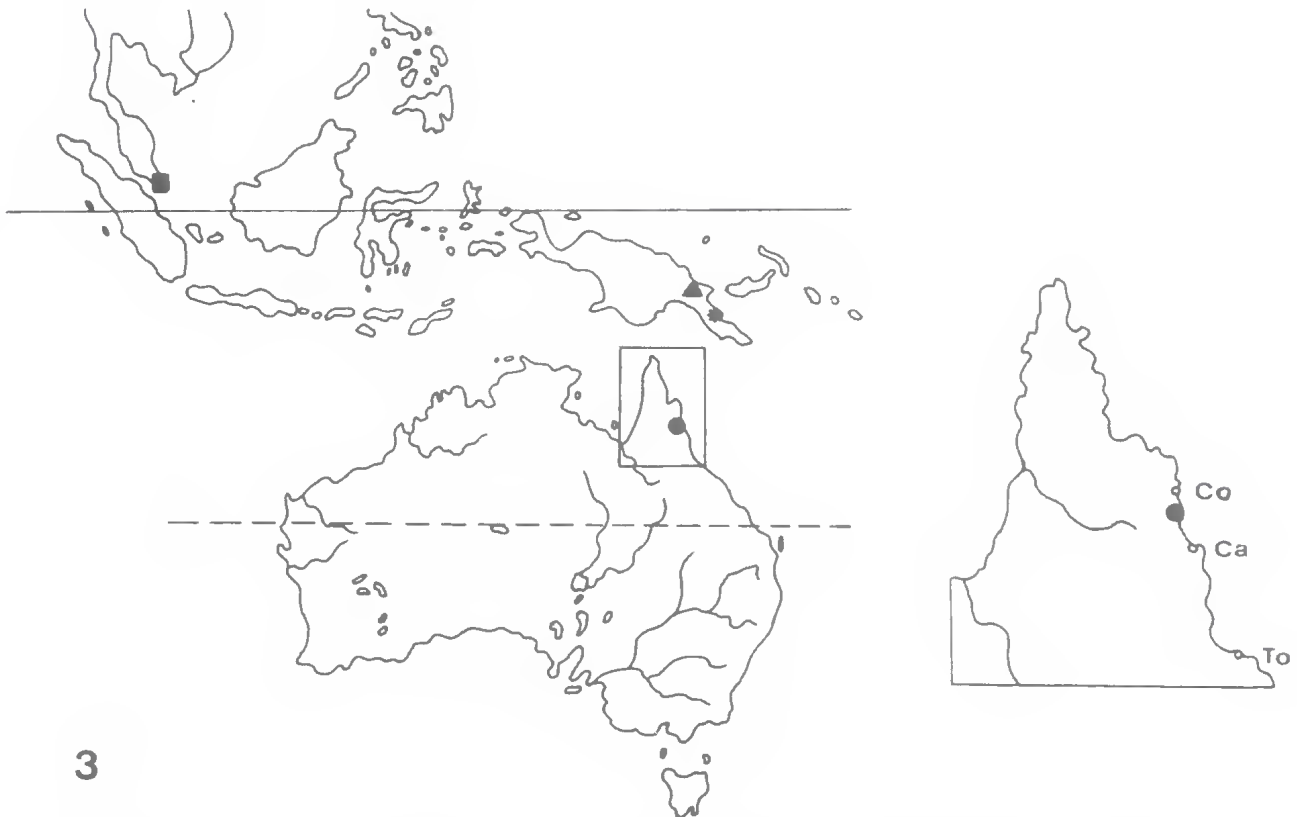


FIG. 3: Distribution of the species of the genus *Colasidia*: ■ = *C. malayica* Basilewsky, ▲ = *C. madang* Darlington, ★ = *C. papua* Darlington, ● = *C. monteithi* sp. nov. Co = Cooktown, Ca = Cairns, To = Townsville.

New Guinea back to the north and, on the other hand, to a migration further south to northern Australia.

In any case my view of the distribution pattern of the genus could be changed substantially if, for example, further species should be discovered in Southeast Asia or in the Indonesian Islands. Because of their secretive habits and their obvious rarity this will require special and careful searching.

Regarding Australian zoogeography it must be stressed that the single Australian species represents an apotypic form within the genus *Colasidia*. The presence of related species in New Guinea suggests that the ancestor of *Colasidia monteithi* immigrated to Australia from the north via Cape York Peninsula. This has been suggested before for other rainforest species (Darlington 1961). Since all recent species of *Colasidia* are flightless it may be supposed that immigration could only take place step by step at short distances over land. Hence immigration into Australia was only possible at times when the water gaps between New Guinea and North Queensland were considerable narrower, and when rain forests in North Queensland covered much larger areas and were contiguous. This high degree of apomorphy in several morphological characters and the distribution at the base of Cape York Peninsula clearly demonstrates that *C. monteithi* is not a recent immigrant from New Guinea, but that it represents a fairly old member of the soil living fauna of the rain forests of North Queensland.

ACKNOWLEDGEMENTS

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